..:: Introduction ::..

When we took our first look at the nForce2 chipset, we were very impressed overall with the performance that it provided, along with some of the more unique features it brought to the surface, such as it's DualDDR technology. At that time, the only motherboards that were available were based off of the SPP Northbridge, however in recent weeks the new IGP Northbridge has made its way onto the market. Today we'll be taking a look at Abit's nForce2 IGP offering, the NF7-M. The NF7-S has received a large amount of praise, especially in its later PCB revisions. Will the NF7-M live up to our expectations? Well, you'll have to read on to find out. First off let's take a look at the specifications of the board and the product package.

..:: Specifications ::..

Processor

- AMD Athlon/XP, Duron Socket A Processors
- Supports up to 333 Front-Side Bus

Chipset

- Nvidia nForce2 IGP & MCP
- Supports Advanced Configuration and Power Management Interface (ACPI)
- Accelerated Graphics Port connector supports AGP 8X/4X (0.8V/1.5V

Memory

- Supports 3, 184 -pin DIMM sockets for DDR -SDRAM module
- Support up to 3GB of Memory
- Support up to 2 DIMM's DDR 400 memory
- 128 bit Dual DDR Memory Architecture

Integrated Video (VGA)

- Integrated GeForce4 MX AGP Graphics

Audio (APU)

- 6-Channel AC 97 Codec Onboard
- Professional digital audio interface supports 24-bit S/PDIF Out

Onboard LAN

- Onboard 10/100MB LAN Physical Layer Interface

Back Panel I/O Connectors

- PS/2 Mini-Din Mouse & Keyboard Ports
- RJ45 Connector
- Two USB2.0 Ports (l header provided for extra 4 USB 2.0 port)
- One 25-pin D-SUB Female Printer Port
- One 9-pin D-SUB Male Serial Port
- One VGA D-SUB Port
- Game/Midi Port & Audio Jacks

Internal I/O Connectors

- 1 x 32 bit 8X AGP slot
- 5 x 32 bit PCI slot

..:: Package ::..

As is the norm with the bulk of Abit motherboards, when you open up the package don't expect to find much of anything spectacular. The package is nearly identical to that of all other Abit boards that we have we recently reviewed. The NF7-M comes along with your everyday package, not too much to be thrilled about. For the NF7-M, we have one ATA-66/100/133 ribbon cable, one floppy ribbon cable, one USB 2.0 expansion bracket with two USB ports, one rear I/O panel bracket to accommodate for the rear I/O connector placements, and of course, the motherboard user manual and driver disc. Not much to get too excited about in this package. I would have liked to see Abit include a second IDE cable to accommodate users with multiple hard drives or optical disc drives.

One thing I have always loved about Abit is that they take the time to really go over the different BIOS options that they offer, no matter how high-end or low-end the motherboard is. Many other manufacturers will only skim the surface or not even cover the BIOS settings at all. Since Abit is a performance oriented manufacturer, it makes sense for them to spend a great deal of time explaining the available tweaking options to the end user. The manual also comes in several languages for universal use. Abit does a nice job covering the different aspects of the driver and software installations, and several of the other aspects that most other motherboard manufacturers will overlook.

The driver / software CD houses the drivers and software for the Abit nForce2 line of

motherboards, so if you're looking to find a driver, this would be the place to do it. When you first insert the disc into your CD-ROM, the main window will pop up right to the driver install window. Here, you simply click which drivers to install and you're good to go. Within the main window, you'll also be able to install any of the software you wish to. The included software suite is fairly nice with the inclusion of a hardware monitoring program, Adobe Acrobat, and Norton Anti-Virus. Overall the Abit NF7-M comes along with a decent package, although I'd love to see Abit throw in an additional IDE cable within the package. It'd be nice to see a feature or two added to this board such as the SATA RAID which is featured on the SPP based NF7-S, although due to the fact that the price of this board is already raised due to the integrated graphics, it is understandable that Abit would choose to do away with some features to keep the cost down for the consumer.

..:: Feature Set ::..

The Abit NF7-M motherboard comes along with ABIT SoftMenu™ Overclocking, Support for AGP 8x 3.0 Specifications, Dual Channel DDR (Up to DDR400), 10/100M Ethernet On Board, 6-Channel Audio and Optical S/PDIF Out interface, GeForce4 MX Graphics, and Abit's 5-bit FID, along with support for USB 2.0 capable devices. Before we take our customary trip around the motherboard PC, those of you whom may still be unfamiliar with the features or specifications of the nForce2 chipset will want to read our quick coverage of the chip on the next page.

..:: nForce2 IGP / SPP ::..

The majority of the more important features brought to the table by the nForce2 platform belong to the chipset's Northbridge. When the first nForce chipset was release, those marketing guru's over at NVIDIA decided to take rethink the naming scheme for the nForce2 Northbridge, and what they came up with was the IGP and SPP. These two acronyms stand for "Integrated Graphics Platform" and "Single Platform Processor." The IGP and SPP differ only in the fact that

the SPP lacks integrated graphics and is geared towards the high performance crowd. The original nForce IGP featured several of the same items we'll be discussing today with the nForce2, although they have all be improved upon. The original nForce platform IGP debuted with GeForce2 MX integrated graphics, while the nForce2 IGP features a more modern GeForce4 MX for integrated graphics. The original nForce platforms integrated graphics were viewed as outdated, and simply could not support the bulk of the operation that end users were looking to be able to do, hence why the nForce2 IGP now features GeForce4 MX graphics.

The nForce2's integrated graphics core clocks in at an identical speed to that of the GeForce4 MX 420, 250MHz. NVIDIA has made no design or feature changes to the GeForce4 MX core used in the nForce2 IGP, so since most of you are more than likely already familiar with it I won't go into that matter any further. The only reason I don't particularly care for the GeForce4 MX core being utilized for the integrated graphics is due to its lack of true DirectX 8.1 support as I noted many months ago in our review of eVGA's MX offering. I would have much rather seen a stripped down version of the higher end GeForce4 core, however due to the relative cost, this didn't happen. The only main feature change between the nForce and nForce2 involving graphics is the level of AGP support. The original nForce platform only supported up to AGP 4x speeds, while the current nForce2 platform features support for AGP 8x.

Yet another feature taken from the original nForce platform is the DualDDR, or TwinBank, Memory Architecture. This 128-bit memory architecture allows for a larger memory bandwidth than even that of Intel's RDRAM powered i850E chipset! The only real "problem" is that the performance difference between 64-bit and 128-bit DDR is only negligible without the integrated graphics enabled. The reason for this should be rather self explanatory as most of us know this is due to the heavy bandwidth usage of the integrated graphics. Without integrated graphics enabled, there is no such "lost" bandwidth, hence there isn't a large performance increase as one would assume.

..:: DualDDR Architecture ::..

DualDDR

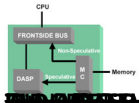
DualDDR is the latest version of NVIDIA's own Dual Channel DDR solution. The typical memory bus of today is 64-bits wide, while the nForce2 chipset utilizes a bus width double that at 128-bits wide. This allows for a peak gain in bandwidth of 100%! As we stated earlier however,

this will truly only be useful when the onboard graphics are enabled as the system's front side bus can only handle a given amount of bandwidth. Anymore than that becomes, in essence, useless. The nForce2 chipset is capable of up to 6.4 GB/sec of bandwidth with a Dual DDR400 setup. In modern graphics cards, we've seen the incredible amount of bandwidth they require to keep the data flowing, so it's safe to say that the extra bandwidth created from the 128-bit wide memory bus will only aid the onboard graphics.

The key to my heart with DualDDR deals with the performance optimization. NVIDIA has optimized the nForce2 to put out maximum performance when the CPU Front Side Bus and Memory Clock run in synchronous mode. In case you're unfamiliar with this term, this means that the FSB and Memory Clock will run at identical frequencies, while asynchronous mode means that each will operate at its own independent speed. Well, why is this fact the key to my heart? Simple, it can save you the one thing you love the most, well almost, money. With NVIDIA's nForce2 platform, if you're running a 266MHz FSB AthlonXP, you only need DDR266 memory for optimal performance. If you're running a 333MHz FSB AthlonXP, you only need DDR333 for optimal performance. Instead of having to buy the absolute fastest, and more than likely most expensive RAM on the market, you can save a good deal of money when purchasing "slower" RAM, or you could use the extra cash to stock up on more RAM, since as we all know, you can never have enough RAM.

Well, why exactly does the nForce2 platform allow for maximum performance when the FSB and Memory Clock run at the same speeds? Shouldn't DDR333 provide a higher level of performance, and so forth with DDR400? Well, to put it plainly, no. When the CPU FSB and Memory Clock are running at the same speed, the CPU Read Latency will be at its lowest. The address that the CPU sends to the memory and the data returned are sent back and forth at the same speed within the IGP/SPP's memory controller. This means that the CPU does not have to wait for any conversions, commonly termed as "overhead," to take place before it can be sent the necessary data. When the FSB and Memory Clock are running in asynchronous mode and are operating at different frequencies, this overhead penalty requires the data being sent back and forth to be synchronized with the clock domain that it will be entering. If data is going from a clock domain of 133MHz to 166MHz, the data must be resynchronized, therefore using up clock cycles and increasing latency. This is exactly why you'll want to run your nForce2 system FSB and Memory Clock in sync.

..:: Dynamic Adaptive Speculative Pre-Processor (DASP) ::..


CPU
FRONTSIDE BUS
Non-Speculative
Speculative
DASP
M C
Memory